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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/086,496	02/28/2002	Geun-young Yeom	YPL-0026	2172
23413	7590	03/30/2004	EXAMINER	
CANTOR COLBURN, LLP 55 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002			CROWELL, ANNA M	
			ART UNIT	PAPER NUMBER
			1763	
DATE MAILED: 03/30/2004				

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/086,496

Applicant(s)

YEOM ET AL.

Examiner

Michelle Crowell

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 February 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 February 2002 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>July 12, 2002</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the retarding grid must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 3, 4, and 11 are rejected under 35 U.S.C. 102(b) as being anticipated by Campana (U.S. 4,713,542).

Referring to Figures 1, 2, 3 and column 3, line 25-column 4, line 6, Campana discloses an apparatus using a neutral beam comprising: an ion source 14 for extracting and accelerating an ion beam having a predetermined polarity; a grid 10 having a plurality of grid holes through which the ion beam passes (col. 3, lines 25-42); a reflector 18 having a plurality of reflector passages, the reflector passages communicating with the grid holes such that the ion beam passed through the grid holes is reflected by surfaces of the reflector passages and neutralizing the ion beam into a neutral beam (col. 3, lines 43-62); and a stage for placing a substrate (sample) to be

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processed in a path of the neutral beam. Note. Figure 3 discloses a substrate, and thus it is inherent for substrate to be held on a stage in order to prevent the substrate from moving around.

With respect to claim 3, the apparatus further includes the reflector 18 passage having a circular section (see Fig. 1).

With respect to claim 4, the apparatus further includes the grid 10 having a cylindrical shape and the reflector 18 has a cylindrical shape (see Fig. 1 and 2).

With respect to claim 9, the apparatus further includes that the reflector is formed of a metal substrate (col. 3, lines 52-59).

With respect to claim 11, the apparatus further includes the circular section of the reflector passage 18 having a diameter which is equal to or greater than that of the grid hole 10 (see Fig. 2).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later

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invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Campana (U.S. 4,713,542) in view of Yunogami et al. (Development of neutral-beam-assisted etcher).

The teachings of Campana have been discussed above.

Campana fails to teach a retarding grid.

Referring to page 955, column 1, line 18- page 955, column 2, line 1, Yunogami et al. teaches providing retarding grids in a neutral beam assisted etcher in order to eliminate all ions. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to provide the apparatus of Campana with a retarding grid as taught by Yunogami et al. since this would further eliminate ions.

7. Claims 5-7 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Campana (U.S. 4,713,542) in view of Albridge, Jr. et al. (U.S. 4,775,789).

The teachings of Campana have been discussed above.

Campana fails to teach reflector passages that are slanted to an advancing direction of an ion beam and having an angle between 5° to 15° .

Referring to Figures 2, 3, 5, and 6 and column 3, line 18-column 4, line 19, Albridge, Jr. et al. teaches an etching apparatus having reflector passages 15 and 16 that are slanted to an advancing direction of an ion beam in order to produce a converging or diverging neutral beam (col. 4, lines 1-19). Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention for the reflector passages of Campana to be slanted to an advancing

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direction of an ion beam as taught by Albridge, Jr. et al. in order to produce a converging or diverging neutral beam.

Campana fails to teach a reflected angle between 5° to 15° .

Referring to column 3, lines 26-55, Albridge, Jr. et al. discloses using a reflected angle between 1° to 4° to achieve high efficiency neutralization. Additionally, as the angle increases, the efficiency decreases. Furthermore, the percentage of neutralization is a function of the angle. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to provide the reflector passages of Campana in view of Albridge, Jr. et al. with a reflected angle between 5° to 15° as taught by Albridge, Jr. et al. in order to achieve the desired percentage of neutralization. In addition, in *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984), the Federal Circuit held that, where the only difference between the prior art and the claims was a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device was not patentably distinct from the prior art device.

8. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Campana (U.S. 4,713,542) in view of Yoshida et al. (4,859,908).

The teachings of Campana have been discussed above.

Campana fails to teach the ion source is an inductively coupled plasma source.

Referring to Figure 9 and column 1, lines 21-24, Yoshida et al. teaches that it is

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conventionally known in the art to use an inductively coupled plasma source as the ion source. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention for the ion source of Campana to be an inductively coupled plasma source as taught by Yoshida et al. since it is conventionally known in the art to use an inductively coupled plasma source as the ion source. Additionally, inductively coupled plasma source is an equivalent source for producing ions.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Motley et al '977, Fink et al. '576, Nagai '198, Ono et al. '535, and Kinoshita et al. '040 teach apparatus using a neutral beam.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michelle Crowell whose telephone number is (571) 272-1432. The examiner can normally be reached on M-F (8:00 - 4:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on (571) 272-1439. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

AMC *Qm*
03-16-04

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